

What is claimed is:

1. A device having a first module arranged in relation to a process line for providing a first signal containing information about sensed entrained air/gas in a fluid or process mixture flowing in the process line at a process line pressure, the device comprising:

5 a bleed line coupled to the process line for bleeding a portion of the fluid or process mixture from the process line at a bleed line pressure that is lower than the process pressure;

a second module arranged in relation to the bleed line, for providing a second signal containing information about sensed bleed line entrained air/gas in the fluid or process mixture flowing in the bleed line; and

10 a third module responsive to the first signal and the second signal, for providing a third signal containing information about a dissolved air/gas flowing in the process line based on a difference between the sensed entrained air/gas and the sensed bleed line entrained air/gas.

2. A device according to claim 1, wherein the first module is a primary process line

15 entrained air measurement module.

3. A device according to claim 1, wherein the first module includes an array of sensors that measures the speed of sound propagating through the fluid or process mixture flowing within the process line and determines the entrained air based on a measurement using the speed 20 of sound.

4. A device according to claim 1, wherein the second module is a bleed line entrained air measurement module.

25 5. A device according to claim 1, wherein the second module includes an array of sensors that measures the speed of sound propagating through the fluid or process mixture flowing within the bleed line and determines the bleed line entrained air based on a measurement using the speed of sound.

6. A device according to claim 1, wherein the third module is a dissolved air determination processor module.

7. A device according to claim 1, wherein the bleed line is re-coupled to the process line
5 to recirculate the portion of the fluid or process mixture bled from the bleed line.

8. A device according to claim 1, wherein the device includes a boost pump for re-coupling the bleed line to the process line to re-pressurize and reinject the portion of the fluid or process mixture bled back to the process line.

10 9. A device according to claim 1, wherein the device includes a bleed line control module for controlling the bleeding off of the portion of the fluid or process mixture from the process line and the reinjection of the same back to the process line.

15 10. A device according to claim 1, wherein the portion of the fluid or process mixture from the process line is bled off either continuously or periodically.

20 11. A device according to claim 1, wherein the bleed line and flow rates are sized to minimize the amount of stock bleed off while maintained sufficiently high flow rates to maintain sufficiently homogenous flow within a bled-off liquid test section such that a measured gas volume fraction within the bleed line is representative of the amount of gas dissolved in the fluid or process mixture.

25 12. A device according to claim 1, wherein sufficiently high velocities are maintained to avoid problems associated with stratification of the mixture and the problems associated with either the liquid or gas phases "holding up" in the process pipe.

13. A device according to claim 1, wherein the device includes a controller module for controlling the first module, the second module and the third module.

14. A device for measurement of entrained and dissolved gases in a fluid or process mixture flowing in a primary process line having a process pressure, the device comprising:

5 a first entrained air measurement module arranged in relation to the primary process line, for sensing entrained air in the fluid or process mixture and providing a first entrained air measurement module signal containing information about sensed primary process line entrained air;

10 a bleed line coupled to the primary process line for bleeding a portion of the fluid or process mixture from the primary process line at a bleed line pressure that is lower than the process pressure;

15 a second entrained air measurement module arranged in relation to the bleed line, for sensing entrained air in the fluid or process mixture in the bleed line, and providing a second entrained air measurement module signal containing information about sensed bleed line entrained air; and

20 a dissolved air/gas determination processor module responsive to the first entrained air measurement module signal and the second entrained air measurement module signal, for providing a dissolved air/gas determination processor module signal containing information about a dissolved air/gas in the fluid or process mixture flowing in the primary process line based on a difference between the sensed primary process line entrained air and the sensed bleed line entrained air.

15. A device according to claim 14, wherein the primary process line entrained air measurement module includes an array of sensors that measures the speed of sound propagating through the fluid or process mixture flowing in the process line and determines the entrained air based on a measurement using the speed of sound.

16. A device according to claim 14, wherein the bleed line entrained air measurement module includes an array of sensors that measures the speed of sound propagating through the fluid or process mixture flowing in the bleed line and determines the bleed line entrained air
5 based on a measurement using the speed of sound.

17. A device according to claim 14, wherein the bleed line is re-coupled to the primary process line via a boost pump to reinject the fluid or process mixture bled back into the primary process line.

10 18. A device according to claim 14, wherein the device includes a bleed line control module for controlling the bleeding off of the portion of the fluid or process mixture from the process line and the reinjection or recirculation of the same back to the primary process line.

15 19. A method for measuring entrained and dissolved gas in a fluid or process mixture flowing in the process line at a process line pressure, comprising the steps of:

measuring a first entrained gas in the fluid or process mixture flowing in the process line and providing a first signal containing information about the same;

20 bleeding a portion of the fluid or process mixture from the process line into bleed line having a bleed line pressure that is lower than the process pressure;

measuring a second entrained gas in the fluid or process mixture flowing in the bleed line providing a second signal containing information about the same; and

25 responding to the first signal and the second signal, and determining a dissolved air/gas flowing in the process line based on a difference between the first entrained air/gas and the second bleed line entrained air/gas.

20. A method according to claim 19, wherein the step measuring the first entrained gas includes arranging a first module having an array of sensor in relation to the process line for determining the first entrained gas based on a speed of sound measurement.

21. A method according to claim 19, wherein the step measuring the second entrained gas includes arranging a second module having a corresponding array of sensor in relation to the bleed line for determining the second entrained gas based on a corresponding speed of sound
5 measurement.